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Geese on Rowley Island, NWT, in 1987 and 1988

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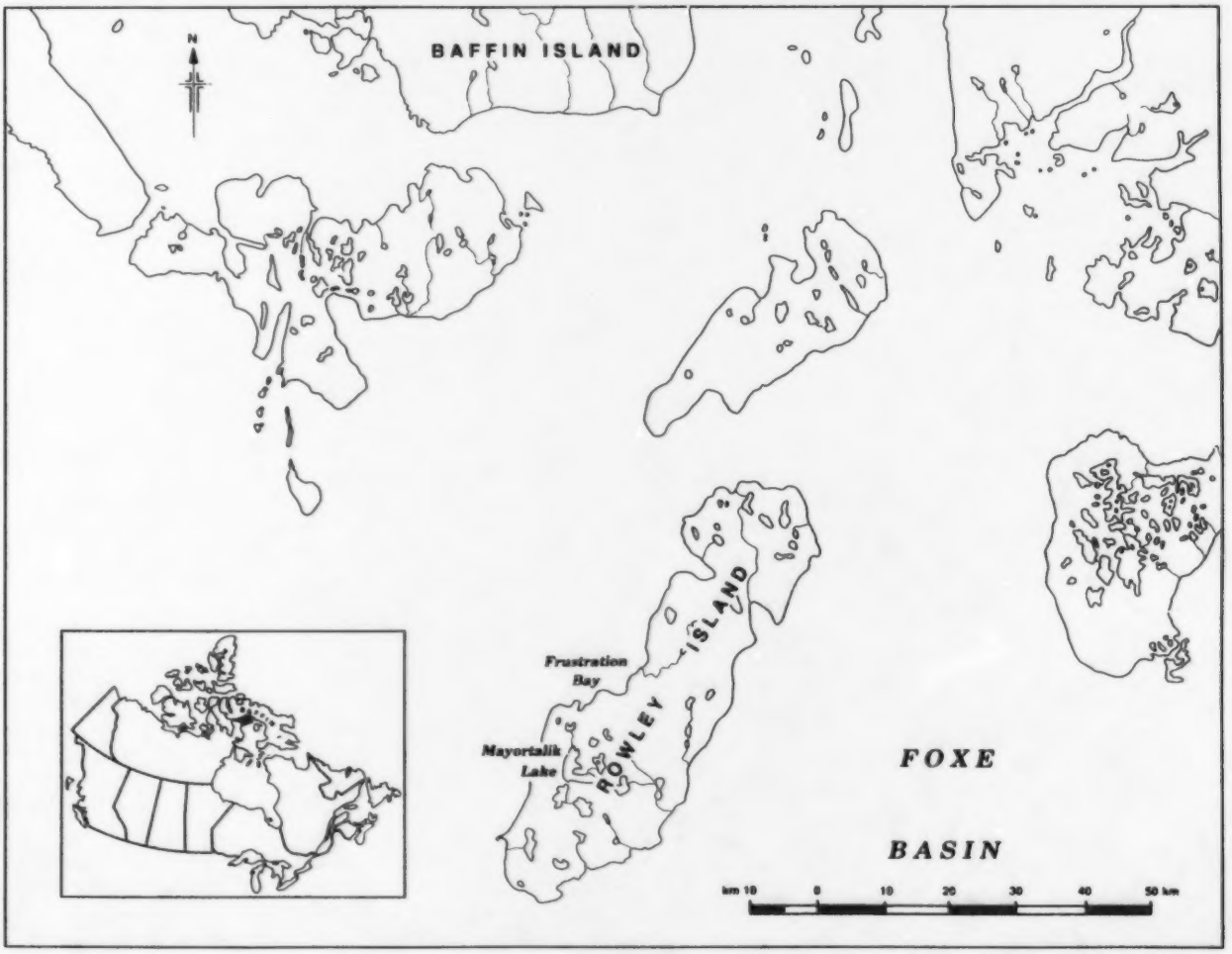
Abstract

A shorebird research project involved visits to Rowley Island (69°06′N, 77°52′W: see Fig. 1) from 27 June to 14 July 1987 and from 5 to 25 July 1988. Low-level aerial surveys on 27 June 1987 and 15–16 July 1988 made it possible to estimate the numbers of geese on the island, and ground searches in study areas near Mayortalik Lake (also known as Butterfly Lake) provided information on the nesting and hatching success of two groups of Greater Snow Geese *Anser caerulescens atlanticus*. Lesser Snow Goose *A. c. caerulescens* and Canada Goose *Branta canadensis* are added to the species known to breed on Rowley Island.

Introduction

Published information on the status of geese on the islands in northern Foxe Basin (Fig. 1) is sparse. Bray (1943) worked in the area in 1936–37, but did not visit Rowley Island (69°06′N, 77°52′W). Ellis and Evans (1960) reported incidental observations on birds by fisheries survey teams in the region

Figure 1
Rowley Island in northern Foxe Basin



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in 1955–57, including lengthy visits to western Rowley Island. They reported sightings of snow geese *Anser caerulescens* and Brant *Branta bernicla*, but no breeding. An extensive aerial survey of the shores of Foxe Basin on 7–9 July 1979 (Reed *et al.* 1980) included an inspection of the east coast of Rowley Island, where a few Greater Snow Geese *A. c. atlanticus*, including apparent breeding birds, were seen. Observations made in 1987 and 1988 give some indication of year-to-year changes in goose numbers and breeding effort.

Methods

Aerial surveys were made on 27 June 1987 and 15–16 July 1988. The aerial survey on 27 June 1987 was carried out by three observers (N.J. Crockford, R.I.G. Morrison, and HB) in a Twin Otter aircraft, flying at about 160 $km \cdot h^{-1}$ at approximately 100 m, parallel to and 200–400 m inland from the coast. Each observer recorded independently, noting times as well as positions. The records were amalgamated, using the means of individual estimates of numbers where these differed. The records distinguished single and pairs of geese (both classes taken to indicate breeding birds) and larger groups. Not all the "white"-phase geese seen could be identified confidently as either Lesser Snow Geese *A. c. caerulescens* or *A. c. atlanticus*; following the procedure used by Reed *et al.* (1980), the numbers of "blue"-phase *caerulescens* seen were used as an index to the frequency of Lesser Snow Geese, assuming that the proportion of blue- to white-phase geese was 1:4, as on the Baffin Island shore of Foxe Basin. The interior of the island was not searched. Geese seen from the ground in the midwestern interior on 1 July have been added to the 1987 total.

The aerial searches on 15–16 July 1988 were made from a low-flying helicopter, making frequent stops in the north, but searching nearly uninterruptedly elsewhere. At the time of the survey, most of the adult geese were in flightless moult, forming dense groups on lakes at the approach of the helicopter. Most of the young geese likely to be produced had already hatched and were in family parties, which tended to be separate from the groups of moulting adults. The observers (R.I.G. Morrison and HB) recorded birds on the left and right of the flight path. Both made estimates of numbers in the larger flocks — most of these flocks were circled, and some of them were photographed, to improve estimates of numbers of blue-phase geese (relatively hard to see) and of goslings in broods.

Ground searches were made between 27 June and 14 July 1987 and between 5 and 25 July 1988. Most observations from the ground were made in three shorebird study areas and in a valley near the midwestern coast (Fig. 1), supplemented by brief searches in the north, when the helicopter was on the ground and R.I.G. Morrison was engaged in habitat classification. All nests found were checked for eggs and for evidence of hatching or destruction by predators. Eggs were measured (to 0.1 mm) and weighed (to 1 g) with a Pesola balance. Goslings were weighed but not measured. Some nests were revisited, but few reweighings made, so as to minimize disturbance to the birds.

Results and discussion

There were at least 270 geese on Rowley Island in late June 1987, and over 1000 in mid-July 1988 (Table 1). Most of them were snow geese: 87% in 1987 and 97% in 1988. Assuming that none of the blue-phase birds was *atlanticus*, the numbers of snow geese were allocated to subspecies by the ratio method (Table 2). Few geese seemed to be nesting in 1987, when snowmelt was slow and later than in 1988. In 1987, no nesting Lesser Snow Geese, Canada Geese *Branta canadensis*, or Brant were found.

Canada Goose

In 1987, at least 10 Canada Geese were present in a midwestern valley on 1 July, and two had been seen from the air in the north of the island on 27 June. At least three recent nests were seen in the valley and several pairs were still engaging in territorial disputes on 1 and 3 July, but if breeding had been attempted it had been abandoned. On 7 July, three pairs by the river appeared about to shed their primaries, frequently sitting down with their wings drooped.

In 1988, only one pair of geese was seen flying over that midwestern valley. Two family groups were seen from the air in the southwest on 16 July. In one brood of two, the goslings were small (class I). The second brood, also of two, were well-feathered, implying that the parents had begun nesting in late May or early June, rather than with all other geese in mid-June. The parents of the well-developed brood were noticeably larger than those of the class I brood. All the Canada Geese seen were middle-sized: none could be caught and measured, so they cannot be assigned to a subspecies. C.D. MacInnes (pers. commun.) has observed similar instances of some Canada Geese nesting well ahead of others breeding in the same area, near the delta of the McConnell River, Keewatin, NWT. He suggests that Canada Geese, unlike snow geese, are highly flexible in adapting their nesting to local conditions, so that early arrivals finding temporarily snow-clear areas can quickly begin to nest and are able to persist even when there are later snowfalls.

Brant

In 1987, no Brant nests were found. A few Brant were seen, with some passing over, but not settling on, the midwestern study areas on 29 June and 7 July.

On 15–16 July 1988, at least five nests were seen to be in use, and a few geese not associated with nests were seen during the aerial survey. The only nest visited, on an island only 3 m in diameter in a lake near the mouth of a river flowing north into Frustration Bay, contained four eggs on 8 July (mean dimensions [7.1 ± 0.6 mm] × [43.4 ± 0.6 mm]; weight 68.8 ± 1.4 g; "calculated weight" 74.3 ± 1.6 g [see below, under Greater Snow Goose]). The female was incubating very closely. On 15 July, this pair was not seen at the nesting lake. A visit to the nest by R.I.G. Morrison on 20 July indicated that all the eggs had hatched. This is the first breeding record for the island. Brant were seen in 1979 (Reed *et al.* 1980), but not in the 1950s (Ellis and Evans 1960).

Table 1
Numbers of geese on Rowley Island, 27 June – 1 July 1987 and 15–16 July 1988

Region	Snow goose				Brant[a]		Canada Goose[b]	
	Breeding		Not breeding					
	1987	1988	1987	1988	1987	1988	1987	1988
South	4	18	31	–	4	7	–	8
Midwest	4	64	25	15	10	2	10	4
Northwest	15	62	23	100	2	–	–	–
North	12	126	52	481	6	7	2	–
East coast	12	38	54	–	1	–	–	–
Eastern interior	ns[c]	16	ns	89	ns	–	ns	–
Total	47	324	185	685	23	16	12	12

[a] No. of nests: 1987, 0; 1988, 5.
[b] No. of broods: 1987, 0; 1988, 2.
[c] ns = area not searched.

Table 2
Estimated numbers of full-grown Greater and Lesser Snow Geese on Rowley Island in the first half of July, 1987 and 1988, based on subspecific identification of nesting birds and on the ratio of blue- to white-phase geese in moulting flocks

Year/Description	Greater Snow Geese	Lesser Snow Geese			Total	% Greater Snow Geese
		White	Blue	Total		
1987						
Nesting	47	–	–	–	47	100
Others	55	104	26	130	185	29.7
Total 1987	102	104	26	130	232	44.0
1988						
With broods	275	28	7	35	310	88.7
Small groups	6	16	4	20	26	23.1
Larger groups	299	324	81	405	704	42.5
Total 1988	580	368	92	460	1040	55.8

Lesser Snow Goose

No Lesser Snow Geese appeared to be nesting on 27 June 1987, when at least 130 were present on the island. Over 50 were seen in a valley in the midwest on 1 July; 44 of these remained there until midmorning on 3 July, when they flew off to the north, not to return. None was there on 8 July. It seems likely that the departure was related to the imminent onset of wing moult.

In July 1988, no snow geese used that midwestern valley. Nearly all the Lesser Snow Geese seen on 15 July were in the north and northwest of the island, with a few in the eastern interior. The proportion of *caerulescens* with broods was estimated at 7.6%, much less, absolutely and relatively, than the successful breeding population of *atlanticus*. Because it is usually difficult to count goslings accurately from the air, there are no *caerulescens* data to compare with the ground-based observations on broods of *atlanticus* reported below.

Greater Snow Goose

Small numbers of Greater Snow Geese appeared to be nesting in late June 1987, when there were fewer *atlanticus* than *caerulescens* on the island. In the midwestern study areas, one *atlanticus* nest was found on 2 July 1987 (clutch of five: mean dimensions of eggs [76.3 ± 1.3 mm] × [53.1 ± 1.5 mm]). By 13 July, the nest had been destroyed, probably by a fox.

In July 1988, at least 580 adult Greater Snow Geese were present on Rowley Island, nearly half of them accompanied by broods (Table 2). Over 30 nests were found in, or immediately adjacent to, the study areas. Information on clutch size, hatching success, egg dimensions, weights of newly hatched goslings, and the timing of hatch was collected; using published data on incubation and fledging periods, the dates of start of laying and incubation and the time of first flight can be inferred (Table 3). The 1988 findings agree closely with those reported previously from Bylot, Baffin, and Ellesmere islands. The only novel data are those on weights of goslings and of eggs just prior to hatching. The "calculated egg weights" (*CW*) are derived from the length (*L*) and breadth (*B*) of the egg, measured in centimetres, using the formula $CW = L \cdot B^2 \cdot K$, where *K* is a constant. Owen (1980) calculated *K* to be 0.556, from a detailed study of the eggs of Barnacle Goose *Branta leucopsis*; he found that *K* also served well for other species of geese. *CW* is an estimate of the weight of the egg before incubation.

The mean clutch size on Rowley Island in 1988 (4.63 ± 1.50) was virtually identical with that reported from 118 nests on Bylot Island in 1957 by Lemieux (1959). Lemieux noted that early nests tended to contain larger clutches than later ones. The sizes of clutches at hatching on Rowley Island in 1988 were consistent with that finding. The mean size in nine nests

Table 3
Breeding information on Greater Snow Geese on Rowley Island, 1988, compared with published data from more northern parts of the breeding range in earlier years[a]

Parameter	Sample size	Mean	Standard deviation	Range	Reference
Clutch size					
Rowley—1988	27	4.63	1.50	2–9	This study
Bylot—1957	118	4.62	1.50	2–9	Lemieux 1959
Bylot—1968	34	3.4			J.D. Heyland, in Palmer 1976
Bylot—1969	32	3.62			J.D. Heyland, in Palmer 1976
Baffin—1969	22	3.64		1–6	J.D. Heyland, in Palmer 1976
Brood size at hatch					
Rowley—1988	15	3.47	2.33	2–9	This study
Egg size (mm)					
Length					
Rowley—1988	79	82.0	2.26	76–90	This study
Bylot—1957	123	81.2		74–91	Lemieux 1959
Breadth					
Rowley—1988	79	54.0	1.49	50–58	This study
Bylot—1957	123	53.4		50–57	Lemieux 1959
Egg weight (g)					
Observed					
Rowley—1988	78	114.2	25.5	98–146	This study
Bylot—1957	85	126		106–149	Lemieux 1959
At hatch					
Rowley—1988	15	104.8	6.5	98–124	This study
Calculated					
Rowley—1988	78	128.6	23.1	114–155	This study
Various		129			Owen 1980
Weight of newly hatched gosling (g)					
Rowley—1988	43	85.5	6.9	70–104	This study
Date of hatching					
Rowley—1988	20	10 July	2.1	8–18 July	This study
Bylot—1957	56	10 July	1.5	8–13 July	Lemieux 1959
Start of laying					
Rowley—1988		10 June		7–16 June	This study
Bylot—1957	22	12 June	1.4	8–20 June	Lemieux 1959
Start of incubation					
Rowley—1988		16 June		14–24 June	This study
Date of first flight of young					
Rowley—1988		21 August		19–29 August	This study
Bylot—1957		20 August			Lemieux 1959
Fosheim Peninsula—1957				18–26 August	Parmelee and Macdonald 1960

[a] Length of incubation period assumed to be 24 d; length of laying period assumed to be $n + 1$ d, where n = clutch size; date of first flight assumed to be hatching date + 42 d.

in which laying probably started between 7 and 10 June was 5.33 ± 1.80; that in 12 nests in which laying started between 11 and 16 June was 4.17 ± 1.11.

Lemieux (1959) reported the fate of 253 eggs in 52 nests: 13 of the nests were deserted (perhaps due in part to his disturbance), and four were completely destroyed by predators. There were partial losses from eight nests, six losing one egg and two each losing three. He noted no infertile eggs. In July 1988, we found some empty nests and others from which the young seemed to have hatched before the nest was found. Nests no longer in use were found only incidentally, so that there is no measure of losses of eggs or of entire clutches. In 1988, five of 22 nests had eggs that failed to hatch. One nest with four newly hatched goslings on 9 July also contained a very small unpipped egg (43.4 mm × 37.2 mm; weight 16 g). A nest from which two young had hatched held an egg with an embryo that must have died about 10 d before the completion of development. A nest found on 14 July held seven cold eggs, apparently deserted: they had disappeared by 20 July. A clutch of five eggs, which should have hatched about 7 July, was still being incubated when last seen on 22 July. In another nest, from which one gosling left on 7 July, three remaining eggs continued to be incubated until at least 17 July, but had been abandoned by 22 July. The failure of 17 of 103 eggs to hatch seems proportionately large.

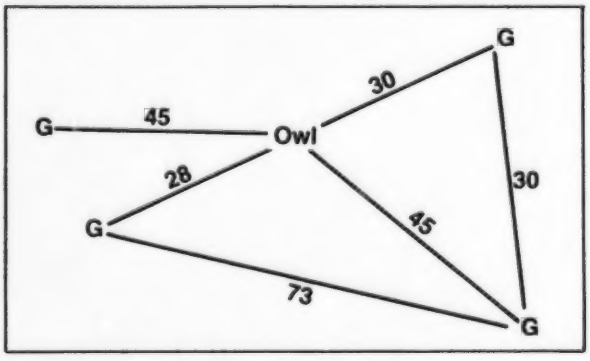
Association of goose nests with Snowy Owl nests

Three active nests of Snowy Owls *Nyctea scandiaca* were found in the intensive study areas: two close to the Mayortalik River, about 1 km apart, the third 4 km to the north–northeast. The nearest goose nest to the southernmost owl nest was about 80 m distant: the eggs appeared to have hatched successfully before the owl nest was found on 7 July 1988. No other goose nests were near. The second owl nest was found on 10 July, when it held one egg and two very small young. A Greater Snow Goose nest was about 50 m from the owl nest: it held four newly hatched young. No other goose nests were within 300 m.

The third owl nest, which held three young when found on 13 July, had four goose nests within 50 m, distributed roughly as shown in Figure 2. This was the closest clumping of goose nests that we found. Three of the four clutches hatched successfully. The fourth, of seven eggs, was cold and apparently deserted when found on 14 July (see above, under Greater Snow Goose).

Association of nesting geese with Snowy Owl nests has been noticed elsewhere (e.g., on Bathurst Island, NWT: D. Gill, pers. commun.). Reporting on breeding Greater Snow Geese on Bylot Island in 1957, Lemieux (1959) noted, "The geese would not nest so close to owls if they were usually bothered by them. They may even do so because owls rid the habitat of weasels."

Figure 2
Distribution of four goose nests (G) around the owl nest found on 13 July 1988. Approximate distances are shown in metres.



Unusual social associations of geese with broods

On 13 July 1988, on a steep slope above the Mayortalik River, three adult Greater Snow Geese were accompanying a brood of five class I goslings. They moved quickly away from the approaching observers. From their behaviour, the two adults with the goslings were both females. They were very similar in appearance. The third adult, which placed itself between the brood and the observers, was noticeably larger and maintained male defensive postures as the group withdrew over the top of the slope.

Less than an hour later, in order to escape us, a pair of geese led their brood across a difficult mass of broken ice in Mayortalik Lake (also known as Butterfly Lake). They differed in size and head shape and were presumably a female and a male. A third large adult accompanied them, remaining 20–30 m behind them and closer to the observers. It repeatedly held out its partly raised wings and arched its neck in a male defensive display. After the family group had distanced itself from the observers by 400 m or so, the third adult remained near them, without displaying or attempting to join them closely.

In neither of these cases did the behaviour of the geese suggest that the third bird might be a prebreeder still remaining with its parents one or two years after its birth. Such persistent attachments are seen quite often among geese of several species. Trios of sexually mature adults are less common, although noted occasionally, both in breeding groups and in staging and wintering flocks. Because all the breeding geese left the study areas shortly after their broods became mobile, moving to areas beyond our range, it was impracticable to verify whether these brief glimpses reflected continuing associations or whether they had been brought about by the presence of people.

Regional comparison with 1979

Table 4 compares the numbers of snow geese seen on Rowley Island in 1988 with those found in various parts of Foxe Basin on 7–9 July 1979 by Reed *et al.* (1980). In 1979, only the east side of Rowley Island was inspected, and all the snow geese seen were believed to be *atlanticus*. Greater Snow Geese also predominated on other islands in northern Foxe Basin and on the north and west coasts of the basin, although they were scarce to the east (and south).

Table 4
Estimated numbers of adult Greater and Lesser Snow Geese on Rowley Island in July, 1987 and 1988, compared with numbers seen on islands in, and along the coasts of, northern Foxe Basin on 7–9 July 1979 by Reed *et al.* (1980)

	Breeding		Not breeding		% Greater Snow Goose	
Location	Greater Snow Goose	Lesser Snow Goose	Greater Snow Goose	Lesser Snow Goose	Breeding	Not breeding
Rowley Island						
1979 (east coast)	7	0	9	0	100	100
1987 and 1988	322	35	360	555	90.2	39.3
Northern Foxe Basin, 1979						
North coast	147	0	2143	266	100	89.0
West coast	211	3	158	17	98.6	90.3
East coast	0	18	20	209	0	8.7
Other northern islands	43	0	7	51	100	12.1

In August 1985, A. Reed and HB found that both *caerulescens* and *atlanticus* had bred successfully on the Baird Peninsula, 80 km east of Rowley Island. A group of 59 flightless adults caught and banded on 9 August included 26 Greater Snow Geese (13 females, 13 males) and 33 Lesser Snow Geese (22 females—two blue-phase; and 11 males—six blue-phase).

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